

What is claimed is:

[Claim 1] A method for chemical mechanical polishing (CMP) patterned oxides using a ceria-based slurry, comprising the steps of:

adding a quantity of silica to the slurry wherein a ratio of ceria concentration to silica concentration (ceria:silica) is from approximately 10:1 to nearly 1:1 by weight.

[Claim 2] The method of claim 1, wherein:

the concentration of ceria in the slurry is approximately 1.0 – 5.0 wt%; and

the concentration of silica in the slurry is approximately 0.1 – 5.0 wt%.

[Claim 3] The method of claim 1, including the step of selecting the ratio of ceria concentration to silica concentration (ceria:silica) from the group consisting of from 10:1 to 7:1, from 10:1 to 4:1, from 10:1 to 1.1:1, approximately 10:1, approximately 7:1, approximately 4:1, greater than 1:1, greater than 4:1, and greater than 7:1.

[Claim 4] The method of claim 11, wherein:

the ceria has a first particle size and the silica has a second particle size; and

a ratio of first particle size to second particle size (ceria:silica) is selected from the group consisting of approximately 1:1, approximately 1.5:1, approximately 2:1, and approximately 2.5:1.

[Claim 5] The method of claim 1, wherein:

the ceria particles have a particle size of 150–250 nm; and

the silica particles have a particle size of greater than 100 nm.

[Claim 6] The method of claim 5, wherein the ceria particles have a particle size of 180–220 nm.

[Claim 7] The method of claim 5, wherein the silica particles have a particle size of 130–190 nm.

[Claim 8] The method of claim 1, wherein the silica particles comprise fumed silica.

[Claim 9] The method of claim 1, wherein the slurry has a pH of approximately 9.0.

[Claim 10] The method of claim 1, wherein wherein the patterned oxide is selected from the group consisting of shallow trench isolation (STI), premetal dielectric (PMD) and interlevel dielectric (ILD).

[Claim 11] A slurry for performing chemical mechanical polishing (CMP) of oxides on a substrate, comprising:

ceria particles having a first concentration; and

silica particles having a second concentration;

wherein:

the concentration of ceria in the slurry is approximately 1.0 – 5.0 wt%; and

the concentration of silica in the slurry is approximately 0.1 – 5.0 wt%.

[Claim 12] The slurry of claim 11, wherein a ratio of ceria concentration to silica concentration (ceria:silica) is from approximately 10:1 to nearly 1:1 by weight.

[Claim 13] The slurry of claim 12, wherein the ratio of ceria:silica is selected from the group consisting of from 10:1 to 7:1, from 10:1 to 4:1, from 10:1 to 1.1:1, approximately 10:1, approximately 7:1, approximately 4:1, greater than 1:1, greater than 4:1, and greater than 7:1.

[Claim 14] The slurry of claim 11, wherein:

the ceria particles have a first particle size and the silica particles have a second particle size; and

a ratio of first particle size to second particle size (ceria:silica) is selected from the group consisting of approximately 1:1, approximately 1.5:1, approximately 2:1, and approximately 2.5:1.

[Claim 15] The slurry of claim 11, wherein:

the ceria particles have a particle size of 150–250 nm; and
the silica particles have a particle size of greater than 100 nm.

[Claim 16] The slurry of claim 15, wherein the ceria particles have a particle size of 180–220 nm.

[Claim 17] The slurry of claim 15, wherein the silica particles have a particle size of 130–190 nm.

[Claim 18] The slurry of claim 11, wherein the silica particles comprise fumed silica.

[Claim 19] The slurry of claim 11, wherein the slurry has a pH of approximately 9.0.

[Claim 20] A method of CMP polishing patterned oxide comprising the steps of:

using a ceria-based slurry having an initiation time; and
adding a sufficient quantity of silica to the ceria-based slurry to substantially reduce the initiation time and increase process stability while maintaining essential beneficial qualities of the ceria-based slurry.